REMARKS/ARGUMENTS

In response to the Office Action dated May 17, 2010, Applicants amend their application and request continued examination. No claims are added or cancelled so that claims 1-14 remain pending.

In this Amendment the specification is amended to restore part of a paragraph that was apparently overlooked by the translator in preparing the English language translation of the corresponding international patent application. The international application was published as WO 2005/051017. A copy of page 3 of that publication is attached. The paragraph of the present patent application that is amended is paragraph [0015] which corresponds to the paragraph of published international patent application beginning on page 3, in line 3. A comparison of paragraph [0015] of the present patent application as filed in English to the published international patent application clearly lacks language corresponding to words that appear in lines 7-9 of page 3 of the published international patent application. Those words are underlined in the attached page 3 of the published international patent application. For example, the term "BTS," which appears in the principal reference and did not appear in the U.S. patent application as filed, clearly appears in the cited passage of the published international patent application. The correction of the specification by inserting the previously omitted portion of a sentence does not add new matter. Further, the added words are incorporated by reference from the international patent application pursuant to 37 CFR 1.57 and the addition is specifically authorized by that regulation.

In this Amendment claim 1, the sole pending independent claim, is amended to describe in greater detail the wireless radio frequency transmission link. This description is supported in the patent application with respect to the description concerning Figure 2 and the reception demodulator 28. That demodulator 28 is described, in connection with the flow chart of Figure 4 and step 33 at paragraphs

[0025] and [0026] of the patent application as filed. The demodulator 28, like all such devices, strips the carrier signal from the received high frequency signal.

Claims 1-5 and 9 were rejected as anticipated by Schmutz (Published U.S. Patent Application 2001/0031624). This rejection is respectfully traversed, both as to the claims previously presented and as to the claims presented now.

Although there has been no attempt to change the language of the patent application, the term "relay antenna," as used in the patent application, does not mean a "repeater antenna." Rather, the relay antenna means a Base Transceiver Station (BTS) antenna. The present patent application is based upon an international patent application filed in France and has been translated from the French text. When the translator prepared the translation of the international patent application, besides omitting part of one sentence, the French expression "antenne relais" was translated based on sound or a potential English cognate as "relay antenna." However, this translation is inaccurate.

The translational error is shown, for example, by the attached excerpt from the French version of the Wikipedia for the term "Base Transceiver Station" and the attached excerpt from the U.S. Wikipedia article of the same title. Even without the ability to read the French language, a comparison of these two excerpts shows that they are rather different in the meanings that they attribute to the term BTS. Naturally, the French interpretation of these terms is the interpretation applied in drafting the patent application in France, with French inventors, and in the French language. Thus, the BTS of the invention and the present patent application is not the same as the BTS of U.S. prior art, such as Schmutz.

When the foregoing translational issue is understood, then it is apparent that the relay antenna of claim 1 is comparable to the directional antenna 14 of Schmutz. However, in the Office Action, it is apparent that the Examiner is considering the two antennas 11 and 13 of Schmutz, a non-directional antenna and a directional antenna, as, collectively, being comparable to the relay antennal of the invention. This comparison is incorrect. Instead, when the correct interpretation is made, referring to

the BTS antenna 14 as the "relay antenna" of Schmutz, then it is apparent that the assertion of anticipation is incorrect.

With respect to the previously presented claims, there is no wireless radio frequency transmission link between the antenna 14 of Schmutz and the fixed radio frequency station 15 of Schmutz. Therefore, upon reconsideration, the anticipation rejection of claims 1-5 and 9 should be withdrawn. The rejection claims 6-8 and 10-14 are all based upon Schmutz in view of a second publication. In another words, that rejection is based upon the propriety of the rejection of claim 1 as anticipated by Schmutz. When the proper claim interpretation is given, it is apparent that Schmutz cannot anticipate claim 1 and, therefore, the rejection based upon Schmutz in view of Baker pertaining to dependent claims is likewise erroneous. On that basis, upon reconsideration, the rejections should be withdrawn and claims 1-14 allowed.

Further, with respect to the amended claims presented here, when the claims are properly interpreted in view of the terminology employed in the patent application and in Schmutz, it is apparent that Schmutz cannot anticipate or suggest any claim. The relay antenna of the invention, as previously described, provides the connection of the wireless radio frequency transmission link from the relay antenna, i.e., the BTS antenna, to the fixed radio station. That BTS antenna is connected to the demodulator that is expressly described in amended claim 1. Schmutz does not teach this limitation because there is no demodulation device for a high frequency signal received at the BTS antenna 14 of Schmutz. Therefore, Schmutz cannot anticipate nor suggest any of claims 1-14 as presented here.

For the foregoing reasons, reconsideration and withdrawal of the rejection of the claims now pending are earnestly solicited.

Respectfully submitted,

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JAW:ves

téléphonie mobile généralement appelé GSM (Global System Mobile) 3 et du réseau fixe 4.

A l'intérieur du réseau de téléphonie mobile GSM 3, la communication passe d'une antenne relais 5 destinée à communiquer avec le téléphone mobile 1 par une liaison de transmission de données 6 à un ensemble fixe comportant une baie de radiocommunication 7 qui constitue un système de transmission de base appelé généralement BTS (Base Transceiver System), une station de contrôle de base 8 appelée communément BSC (Base Station Controller) et un centre de communication 9 appelé MSC (Mobile Switching Center). Bien entendu, si la communication va du téléphone fixe 2 au mobile 1, les signaux circulent dans le sens inverse.

L'antenne relais 5 pourrait être du type multibande, par exemple monobande, bi-bande ou tri-bande et recevoir et émettre dans des bandes ou canaux de fréquences de 900, 1800 ou 2200 MHz. L'antenne est supportée par un mât indiqué en 11 monté par exemple sur la terrasse d'un immeuble comme on le voit sur les figures 6 et 7.

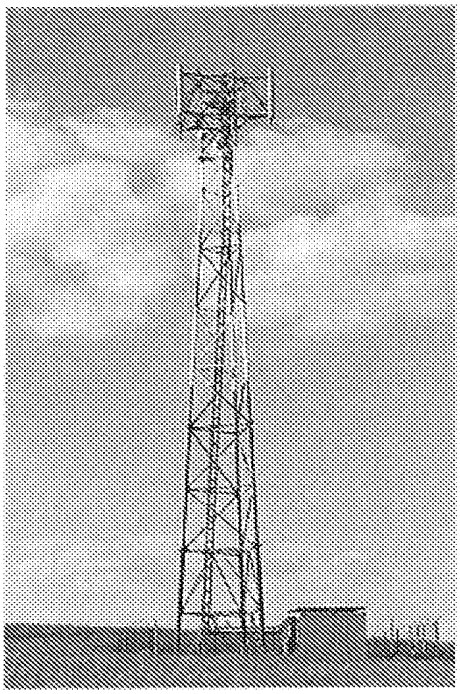
Conformément à l'invention, la liaison entre l'antenne 5 et la baie de radiocommunication 7 est réalisée sous forme d'une liaison par fréquence radio. La transmission sans fil a lieu entre un dispositif d'équipement électronique prévu au pied du mât 11 de l'antenne, enfermé dans un boîtier 12 et un dispositif d'équipement électronique enfermé dans un boîtier 13 associé à la baie de communication 7. Si l'antenne est du type multibande, un boîtier 12 est prévu pour chaque bande. Une baie est prévue pour chaque bande de fréquence de l'antenne 5. Les boîtiers d'antenne 12 et de baie 13 sont équipés de moyens émetteurs et récepteurs des signaux à transmettre, la voie spécifique de transmission des signaux sans fil étant indiquée en 14.

En se référant à la figure 2, on constate que la liaison par fréquence radio sans fil 6 comporte

Base transceiver station

From Wikipedia, the free encyclopedia

A **base transceiver station (BTS)** or **cell site** is a piece of equipment that facilitates wireless communication between user equipment (UE) and a network. UEs are devices like mobile phones (handsets), WLL phones, computers with wireless internet connectivity, WiFi and WiMAX gadgets etc. The network can be that of any of the wireless communication technologies like GSM, CDMA, WLL, WAN, WiFi, WiMAX etc. BTS is also referred to as the *radio base station* (RBS), *node B* (in 3G Networks) or, simply, the *base station* (BS). For discussion of the LTE standard the abbreviation *eNB* for enhanced node B is widely used.



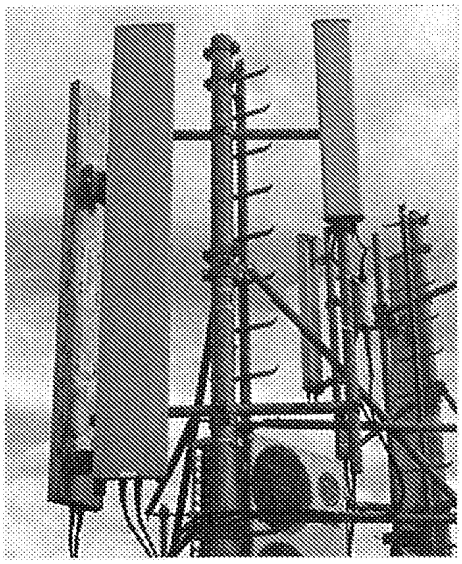
A typical BTS tower which holds the antenna. The tower is quite widely misinterpreted as the BTS itself. The shelter which houses the actual BTS can also be seen.

Contents

BTS in Mobile Communication

A GSM network is made up of three subsystems:

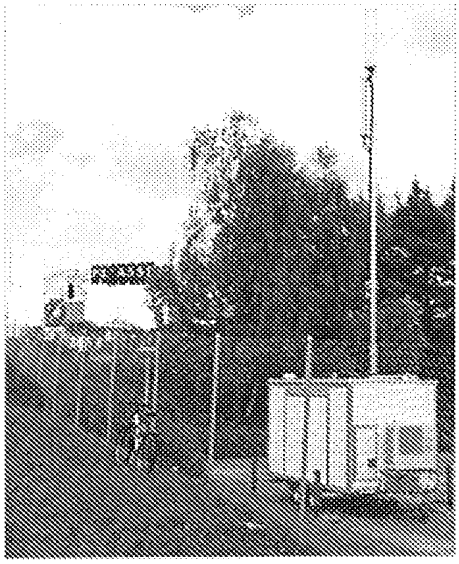
- The Network and Switching Subsystem (NSS) – comprising an MSC and associated registers.
- The Base Station subsystem (BSS) – comprising a BSC and several BTSes
- The [[Operations support system]- for maintenance of the network.



Base transceiver station Antenna in Paris

Though the term BTS can be applicable to any of the wireless communication standards, it is generally and commonly associated with mobile communication technologies like GSM and CDMA. In this regard, a BTS forms part of the base station subsystem (BSS) developments for system management. It may also have equipment for encrypting and decrypting communications, spectrum filtering tools (band pass filters) etc. antennas may also be considered as components of BTS in general sense as they facilitate the functioning of BTS. Typically a BTS will have several transceivers (TRXs) which allow it to serve severaldifferent frequencies and different sectors of the cell (in the case of sectorised base stations). A BTS is controlled by a parent base station controller via the base station control function

(BCF). The BCF is implemented as a discrete unit or even incorporated in a TRX in compact base stations. The BCF provides an operations and maintenance (O&M) connection to the network management system (NMS), and manages operational states of each TRX, as well as software handling and alarm collection. The basic structure and functions of the BTS remains the same regardless of the wireless technologies.



A mobile BTS

General Architecture

A BTS in general has the following units:

Transceiver (TRX)
: Quite widely referred to as the driver receiver (DRX). Basically does transmission and reception of signals. Also does sending and reception of signals to/from higher network entities (like the base station controller in mobile telephony)

Power amplifier (PA)
: Amplifies the signal from DRX for transmission through antenna; may be integrated with DRX.

Combiner
: Combines feeds from several DRXs so that they could be sent out through a single antenna. Allows for a reduction in the number of antenna used.

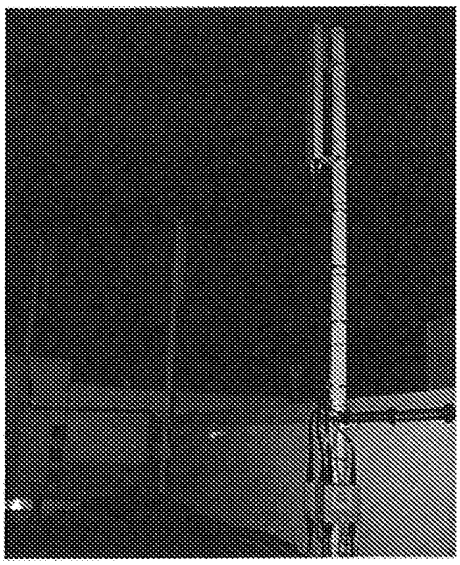
Duplexer
: For separating sending and receiving signals to/from antenna. Does sending and receiving signals through the same antenna ports (cables to antenna).

Antenna
: This is also considered a part of the BTS.

Alarm extension system
: Collects working status alarms of various units in the BTS and extends them to operations and maintenance (O&M) monitoring stations.

Control function
: Control and manages the various units of BTS including any software. On-the-spot configurations, status changes, software upgrades, etc. are done through the control function.

Baseband receiver unit (BBxx)
: Frequency hopping, signal DSP, etc.



A BTS mounted on a building

Important terms regarding a mobile BTS

Diversity techniques
: To improve the quality of the received signal, often two receiving antennas are used, placed at an equal distance to an uneven multiple of a quarter of wavelength (for 900 MHz the wavelength it is 30 cm). This technique, known as antenna diversity or space diversity, avoids interruption caused by path fading. The antennas can be spaced horizontally or vertically. Horizontal spacing requires more complex installation, but better performance is obtained in this configuration.

Other than antenna or space diversity, there are other diversity techniques such as frequency/time diversity, antenna pattern diversity, and polarization diversity.

Splitting

The flow of power within a particular area of the cell, known as sector. Every field can therefore be considered like one new cell. By using directional antennas, the co-channel interference is reduced. A typical structure is the trisector, also known as clover, in which there are three sectors, each one served by separate antennas. Every sector has a separate direction of tracking of 120° with respect to the adjacent ones. If not sectorised, the cell will be served by an omnidirectional antenna, which radiates in all directions. Bisectored cells are also implemented with the antennas serving sectors of 180° separation to one another.

See also

- OpenBTS

References

Further reading

- Satoshi Maruyama, Katsuhiko Tanahashi, Takehiko Higuchi (2002). *Base Transceiver Station for W-CDMA System*. FUJITSU Sci. Tech. J. pp. 7. http://www.fujitsu.com/downloads/MAG/vol38-2/paper07.pdf.

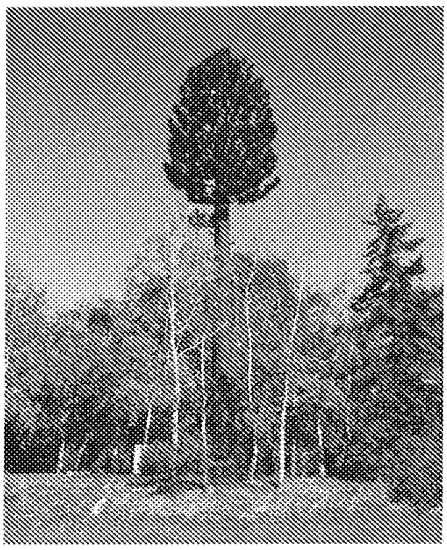
External links

- U.S. Patent 6,577,878

Base Transceiver Station

La **BTS** ou **Base Transceiver Station** est un élément de base du système cellulaire de téléphonie mobile **GSM**, appelé plus communément antenne-relais GSM (à différencier de l'antenne-relais UMTS, de type Node B).

Schématiquement, elle est composée essentiellement d'un élément d'interface avec la station la contrôlant (BSC), d'un émetteur/récepteur (transceiver, *TRX*) et d'une antenne : elle forme ainsi une cellule (base du maillage du réseau).



Antenne relais « arborisée » à Villepreux dans les Yvelines, en France

Fonction

Elle est en charge de la liaison radio avec les stations mobiles.

Les rôles principaux d'une BTS sont :

- activation et désactivation d'un canal radio
- multiplexage temporel (TDMA) et saut de fréquence (**Frequency Hopping**)
- chiffrement du contenu à transmettre (pour la confidentialité de la communication sans fil),
- codage canal, chiffrement des trames, modulation, démodulation et décodage du signal radio (protection contre les erreurs de transmission, interférences, bruits....)
- contrôle de la liaison
- surveillance des niveaux de champ reçus et de la qualité des signaux (nécessaire pour le handover)
- contrôle de la puissance d'émission (limiter la puissance à ce qui est suffisant pour ne pas trop perturber les cellules voisines)

Le domaine de la BTS reste néanmoins la liaison physique radio, l'essentiel des fonctions de contrôle et de surveillance est réalisé par la BSC.

Capacité

Un **TRX** (Transmission/Reception Unit) est un émetteur récepteur qui gère une paire de fréquences porteuses (une en voie montante, une en voie descendante). On peut multiplexer jusqu'à 8 communications simultanées sur un TRX grâce à la technique d'accès multiple TDMA.

En théorie, la capacité maximale d'une BTS est de 12 TRX. Ainsi, elle peut gérer jusqu'à 96 communications simultanées. Mais cette limite n'est jamais atteinte en pratique.

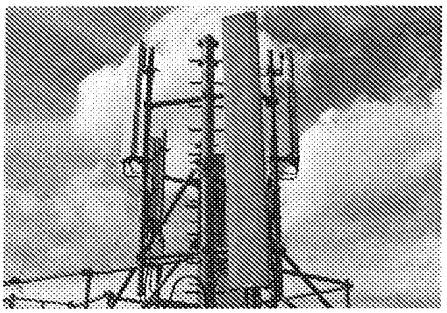
Dans les zones rurales, le rôle de la BTS est d'assurer une couverture. Elle est donc généralement limitée à un seul TRX ou deux si l'opérateur prévoit un TRX de secours. Dans les zones urbaines, la BTS doit assurer une couverture mais également écouler un trafic conséquent. Elle peut donc être équipée de deux à neuf TRX.

Afin d'écouler plus de trafic, les opérateurs préfèrent augmenter le nombre de BTS plutôt que d'augmenter le nombre de TRX par BTS. Ainsi, les interférences entre canaux utilisant les mêmes fréquences sont limitées.

Caractéristiques

Type d'antennes

On peut distinguer les antennes **omnidirectionnelles** (qui émettent à 360°) des antennes bi-sectorielles (180° par antenne) ou tri-sectorielles (120° par antenne) qui sont les plus fréquentes car elles limitent les interférences entre canaux utilisant une même fréquence.



Antenne-relais du réseau GSM

Taille de la cellule

Une BTS classique peut émettre jusqu'à 35 km au maximum. On parle de macro-cellule pour un rayon compris entre 2 km et 35 km et de petite cellule pour un rayon compris entre 500 m et 2 km.

Les micro BTS sont conçues pour les zones urbaines et définissent des micro cellules (rayon inférieur à 500 m).

Classement

BTS normales

La norme GSM impose une sensibilité minimale de -104 dBm en GSM 900 et DCS 1800. Elle définit également plusieurs classes selon la puissance maximale électrique avant couplage :

Numéro de classe	GSM 900	DCS 1800
1	320 W / 55 dBm	20 W / 43 dBm
2	160 W / 52 dBm	10 W / 40 dBm
3	80 W/ 49 dBm	5 W / 37 dBm
4	40 W/ 46 dBm	2.5 W / 34 dBm
5	20 W/ 43 dBm	
6	10 W/ 40 dBm	
7	5 W/ 37 dBm	
8	2.5 W/ 34 dBm	

Pour calculer les niveaux de champs électromagnétiques générés il faut tenir compte des gains d'antenne donc de la PIRE.

Micro BTS

En ce qui concerne les micro BTS, il n'existe que trois classes qui spécifient la puissance maximale d'émission avec couplage, ainsi que la sensibilité.

Numéro de classe	GSM 900	DCS 1800
Puissance maximale		
M1	80 mW / 19 dBm	500 mW / 27 dBm
M2	30 mW / 14 dBm	160 mW / 22 dBm
M3	10 mW / 10 dBm	50 mW / 17 dBm
Sensibilité		
M1	0.2 nW / -97 dBm	0.06 nW / -102 dBm
M2	0.6 nW / -92 dBm	0.2 nW / -97 dBm
M3	2 nW / -87 dBm	0.6 nW / -92 dBm

Sources et contributeurs de l'article

Base Transceiver Station *Source*: http://fr.wikipedia.org/w/index.php?oldid=56634952 *Contributeurs*: Amstramgrampikepikecolegram, En passant, Gscorpio, Guillaume Gielly, Henry Salomé, Karl1263, Koko90, Lgd, Lopio, Maurilbert, Michco, Nono64, Poux, Raoul Deux, TCY, Trou, Vonvon, Xic667, Zubro, ~Pyb, 11 modifications anonymes

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